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U.S. PATENT APPLICATION

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Invention: REMOTE CONTROL UNIT FOR INTELLIGENT DIGITAL AUDIOVISUAL
REPRODUCTION SYSTEMS

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SPECIFICATION

REMOTE CONTROL UNIT FOR INTELLIGENT DIGITAL AUDIOVISUAL
REPRODUCTION SYSTEMS

FIELD OF THE INVENTION

The present invention relates to a remote control unit for intelligent digital audiovisual reproduction systems, also called jukeboxes.

5 BACKGROUND OF THE INVENTION

Remote control systems are known in the prior art that use infrared technology to control a device. These systems comprise a transmitter located on the remote control unit and a receiver located on the device. The
10 use of infrared rays requires the transmitter to be pointed towards the receiver on the device.

OBJECT AND SUMMARY OF THE INVENTION

The object of the present invention is to overcome
15 the drawbacks of the prior art by offering a remote control unit that is user-friendly and secure.

This object is achieved by the fact that the remote control unit for intelligent digital audiovisual reproduction systems, comprising storage means, payment
20 means, a sound control circuit and display means, wherein the remote control unit comprises a radio frequency transmitter that is associated with a radio frequency receiver connected to the sound control circuit of the audiovisual reproduction system.

25 According to another characteristic, the remote control unit has a code that is stored by a learning procedure by the audiovisual reproduction system.

According to another characteristic, at least one audiovisual reproduction system receives a remote control code from the central server that is connected to the reproduction system.

5 According to another characteristic, a function of the remote control is to deactivate or activate the audiovisual reproduction system and the means of payment.

 According to another characteristic, ~~disactivating~~ the means of payment triggers an operator-programmed
10 message to be displayed on the audiovisual reproduction system display means.

 According to another characteristic, a function of the remote control enables the audiovisual reproduction system to be credited with a credit equivalent to the
15 selection of at least one song; the maximum number of credits being stored on storage means of the reproduction system.

 A second object of the invention is to offer a learning procedure of the code of the remote control unit
20 of the invention using an audiovisual reproduction system.

 This object is achieved due to the fact that the learning procedure comprises the following steps:

 - a step in which the audiovisual reproduction
25 system is set to the learning mode,

 - a step of using the remote control unit close to the audiovisual reproduction system, in this operating mode the audiovisual reproduction system waits for at least one remote control identification code,

30 - a step of storing the remote control identification code on the storage means of the reproduction system.

According to another characteristic, the learning mode is included in the operating system of the audiovisual reproduction system.

According to another characteristic, use of the remote control unit causes it to transmit a signal containing an identification code that is contained in the remote control memory.

According to another characteristic, the step of storing comprises the recognition of an identification code in a signal transmitted by the remote control unit.

Other advantages and advantages of the present invention will be better understood from the following detailed description referring to the attached drawing.

- figure 1 shows a block diagram of an intelligent digital audiovisual reproduction system of the prior art.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The sole figure shows the audiovisual reproduction system described in international patent application WO 96/12257. Preferably, but in a non-limitative way, this audiovisual reproduction system uses the equipment parts that are numbered and referred to below.

The central processing unit (1) is a system that is compatible with a high-performance PC. An intel pentium-type system that has storage means and the following minimum characteristics should be used to implement the invention:

- compatibility with the local Vesa bus,
- processor cache buffer: 256 Kbytes,
- RAM: 32 Mbytes,
- high-performance serial and parallel ports,
- SVGA or similar microprocessor graphic adapter,

- SCSI/2 or similar bus controller
- self-powered static RAM.

Any similar CPU with equivalent or better performance characteristics may be used in the invention.

5 This CPU controls and manages a sound control circuit (5), a telecommunications control circuit (4), an input control circuit (3), a mass storage control circuit (2) and a display means control circuit (6). The display means are mainly composed of a high definition, low
10 radiation, non-interleaved SVGA-type flat screen video monitor (62). This monitor is used to reproduce images, for example the album covers of musical selections, graphics or video clips.

Storage modules (21) are also included as storage
15 means using SCSI-type high-speed, high-capacity hard disks and are associated with the storage means already present in the CPU. These modules are used to store audiovisual information.

A high-speed (28.8 kbps) telecommunications modem
20 (41) adapter is built in to allow connection with an audiovisual information distribution network controlled by a central server.

In order to reproduce the sound information of the musical selections the system comprises loud speakers
25 (54) that receive the signal from a tuner-amplifier (53) connected to a music synthesizer-type electric circuit (5). Said electric circuit is built to accommodate a large number of input sources while having an outlet that provides CD (compact disc)-type quality,
30 such as the sound-card type microprocessor multimedia audio adapter.

Using the input control circuit (3), the audiovisual reproduction system controls a touch screen (33) that includes a panel covering the glass and that uses "advanced surface wave technology" as well as an AT-type bus controller. This touch screen enables various selection information used by the customer to be displayed on the video monitor (62) or on a television screen (61). It also displays management control information used by the manager or the owner of the system. It is also used for maintenance repairs in combination with an external keyboard (34) that can be connected to a system with a suitable keyboard connector controlled by a keyed lock (32) via the interface circuit (3).

The interface circuit input (3) also controls a remote control assembly (31).

An audiovisual payment device (35) is also connected to the interface surface input (3). It is also possible to use any other device to receive any method of payment by coins, notes, tokens, chip cards or combinations of methods of payment.

The system is housed in the steel chassis or frame.

In addition to these parts, a cordless microphone (55) is connected to the sound controller (5), which transforms said audiovisual reproduction system into a powerful announcement and information system intended for the public or possibly for a karaoke machine. Similarly, the system can use a cordless loud speaker system.

The remote controlled assembly (31) enables the manager, for example from behind the bar, to access and operate various controls, such as:

- the microphone on/off control,

- the loud speaker muting control,
- the volume control
- the control for canceling music currently being played.

5 The operating system has been designed around a library of tools and services that are particularly directed toward the audiovisual field in a multimedia environment. Advantageously, this library includes a high performance multi-task operating system that effectively
10 authorizes the simultaneous implementation of multiple code fragments. Therefore, this operating system is used, in an organized way that avoids any conflict, for rival implementations, operations implemented on display means, sound reproduction means and for controlling
15 telecommunication connections through a distribution network. Furthermore, this operating system is extremely flexible.

 The compressed and digitized audiovisual data is stored in storage means(21).

20 The library of tools and services comprises a first module, referred to as SSM, that is a start-up module for the system. This module only provides a single service, consequently it is automatically charged when the system is powered-up. The system goes directly into the "in
25 service" mode of the module referred to as RMM if the system is started up using a correct recorded number.

 The RMM module is the "in service" mode module, i.e. the operating mode which the system enters as soon as the recorded number has been validated. In this mode the
30 system is ready to implement any requests that can be triggered by any of a number of predefined operations, such as:

- customers touching the screen: when a customer or user touches the screen, the system transfers control of the foreground session to the CBSM module that controls the customer selection and exploration mode,

5 - the telecommunications network call request server: when the system detects a loop on the telephone line it transmits a background asynchronous procedure: the TSM module telecom service mode,

10 - receiving a remote control signal: when an order is received it is processed in a background session by the SMM system control module. However, the foreground session remains available for other operations.

The system remains in the "in service" mode until one of the above-mentioned operations is implemented.

15 The SMM module is the system control module. The module is used to implement operations that order the system to accept an input requested by a remote control device, these operations being immediately processed without canceling the procedure currently being carried
20 out. A very large number of such operations are possible, of which only a few, non-limitative operations are listed
below:

- volume adjustment of the selections played,
- volume adjustment of the auxiliary source played,
- 25 - microphone on/off control
- adjustment of the microphone volume,
- balance adjustment of left and right channels
- control of the bass frequency level,
- control of the treble frequency level,
- 30 - control for canceling or skipping a musical selection track,

- control for panoramic, zoom in and zoom out effects,

- triggering of software program reset.

The TSM module is the telecommunications service
5 mode module between the central server and the
audiovisual reproduction system. This module is used to
control all the control services available on the
distribution network. All the telecommunication tasks are
controlled as background tasks of the system. These tasks
10 only ever use the processing time that remains once the
system has completed all the foreground tasks. Therefore,
when the system is busy with a high-priority task, the
telecommunication tasks automatically reduce the demands
on the resources of the system and use any processing
15 time the microprocessor leaves available.

The remote control unit according to the invention
constitutes the remote control assembly of the
audiovisual reproduction system. The remote control unit
according to the invention is a remote control unit that
20 uses a radio frequency transmitter. The reproduction
system comprises a radio frequency receiver that is
advantageously located on the sound control circuit (5).
Advantageously, the remote control unit comprises
fastening means that connect it to a component, for
25 example the bar, which is not necessarily directed
towards the reproduction system. The use of radio
frequencies does not require the transmitter to be
directed towards the receiver. Therefore, this
characteristic avoids any deterioration due to the
30 operations involved in directing the remote control unit
toward the audiovisual reproduction system.

The remote control unit has a code in order for an audiovisual system to be customized to a particular remote control. This code is in the form of an address constituted by a DIP switch. When the remote control unit is used the signal it transmits comprises a first data item that contains the code and a second data item that contains the code of the key that has been used. The remote control identification code is stored by the audiovisual reproduction system when the remote control unit is first used, according to a special learning procedure. The procedure comprises several steps.

- In a first step the audiovisual reproduction system is set to the learning mode. This learning mode consists in implementing a sub routine of the library of tools and services of the operating system of the reproduction system. This procedure is triggered by lightly touching a special button that is displayed on the screen by the display means. When the operating system is in this mode it is ready to receive a remote control code to allow the reproduction system to only react when the remote control is actuated, following certain operations. Advantageously, the remote control unit comprises a specific key that triggers a signal being transmitted, said signal comprising the code stored in the memory.

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 In a step of using, the remote control unit, the remote control unit transmits the identification code in the signal when it is used.

- In a step of storing, the audiovisual reproduction system stores the remote control identification code in its storage means. The learning mode of the reproduction system enables it to recognize

and to store the code in the signal transmitted by the remote control unit. At the end of this step the reproduction system returns to the "in service" mode. Therefore, this special learning mode eliminates the need to preprogram the remote control code in the audiovisual reproduction system. Furthermore, once the remote control code has been stored by a reproduction system, every subsequent time the remote control is used, the operating system verifies the identification code of the remote control unit that has just transmitted a signal containing the stored code. If the two codes are identical the function that corresponds to the code of the pressed key will be implemented. If the two codes are not identical there will be no response.

Advantageously, the remote control code is stored in an integrated circuit (I button) that is only powered when an operation is implemented and that is capable of storing serial information in a nonvolatile memory.

Advantageously, a second code of a second remote control unit is stored by one audiovisual reproduction system. This second code can be transmitted to each audiovisual reproduction system using the central server and the distribution network to which the audiovisual reproduction system is connected via the telecommunication modem (41).

The remote control unit according to the invention enables certain actions to be implemented on the audiovisual reproduction system using particular keys and functions controlled by the SMM module. A first function, that is effected using a remote control key, is to disactivate the reproduction system and the payment means. Dis-activating the reproduction system prevents

any payment means, such as tokens, coins, notes, chip cards etc. from being inserted. Advantageously, the audiovisual reproduction system display screen displays a message while the system is disactivated, for example to
5 inform the user that the audiovisual reproduction system is not available. Advantageously, the message can be operator-programmed by the hirer of the audiovisual reproduction system. The reproduction system and the payment means are also brought back into service using
10 either the same key or a different key on the remote control unit.

A second function of the remote control unit is to be able credit the audiovisual reproduction system with a value equivalent to at least one song. The number of
15 songs is updated each time the second function is used and each time an operator modifies the value of said number. This second function enables, for example, the manager of a bar in which the audiovisual reproduction system is installed to provide his customers with at
20 least one selection without him having to go to the reproduction system and without having to carry out complicated operations.

The remote control unit according to the invention may be seen to be more user-friendly as it is not
25 necessary for it to be pointed towards the audiovisual reproduction system. Furthermore, it is possible for it to be fastened, for example to the bar, thereby avoiding the remote control unit becoming lost or broken. The code learning mode avoids a remote control unit having to be
30 associated with a reproduction system during manufacture in a plant. This simplifies stock management. The

additional remote control unit functions also simplify use of the audiovisual reproduction system.

Other modifications available to those skilled in the art can clearly be included in the invention.

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